

Claims

[c1]

Sub
A 2
Cont

1. A thermoplastic composition, comprising:

a poly(arylene ether);

a poly(alkenyl aromatic) resin in an amount of at least about 10 weight percent of the total of the poly(arylene ether) and the poly(alkenyl aromatic) resin;

a polyolefin;

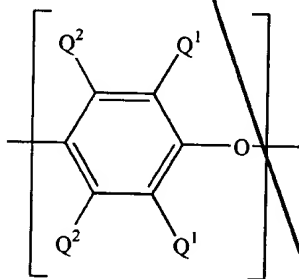
a hydrogenated block copolymer of an alkenyl aromatic compound and a conjugated diene, wherein the hydrogenated block copolymer has an alkenyl aromatic content of about 40 to about 90 weight percent;

a polyolefin-graft-cyclic anhydride copolymer; and

a reinforcing filler.

[c2]

2. The thermoplastic composition of Claim 1, wherein the poly(arylene ether) comprises a plurality of structural units of the formula



wherein for each structural unit, each Q^1 is independently halogen, primary or secondary C_1-C_8 alkyl, phenyl, C_1-C_8 haloalkyl, C_1-C_8 aminoalkyl, C_1-C_8 hydrocarboxy, or C_2-C_8 halohydrocarboxy wherein at least two carbon atoms

separate the halogen and oxygen atoms; and each Q^2 is independently hydrogen, halogen, primary or secondary C_1-C_8 alkyl, phenyl, C_1-C_8 haloalkyl, C_1-C_8 aminoalkyl, C_1-C_8 hydrocarboxy, or C_2-C_8 halohydrocarboxy wherein at least two carbon atoms separate the halogen and oxygen atoms.

[c3]

3. The thermoplastic composition of Claim 2, wherein each Q^1 is independently C_1-C_8 alkyl or phenyl, and each Q^2 is independently hydrogen or methyl.

[c4]

4. The thermoplastic composition of Claim 1, wherein the poly(arylene ether) is a copolymer of 2,6-dimethylphenol and 2,3,6-trimethylphenol.

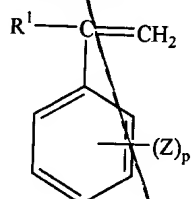
[c5]

5. The thermoplastic composition of Claim 1, wherein the poly(arylene ether) is present at about 10 weight percent to about 55 weight percent, based on the total weight of

the composition.

[c6]

6. The thermoplastic composition of Claim 1, wherein the poly(alkenyl aromatic) resin comprises at least 25% by weight of structural units derived from an alkenyl aromatic monomer of the formula



wherein R¹ is hydrogen, C1-C8 alkyl, or halogen; Z is vinyl, halogen, or C1-C8 alkyl; and p is 0 to 5.

[c7]

7. The thermoplastic composition of Claim 6, wherein the poly(alkenyl aromatic) resin comprises at least one poly(alkenyl aromatic) resin selected from the group consisting of atactic homopolystyrene, syndiotactic homopolystyrene, rubber-modified polystyrene, and mixtures comprising at least one of the foregoing poly(alkenyl aromatic) resins.

[c8]

8. The thermoplastic composition of Claim 1, wherein the poly(alkenyl aromatic) resin is present at about 1 weight percent to about 50 weight percent, based on the total weight of the composition.

[c9]

9. The thermoplastic composition of Claim 1, wherein the polyolefin comprises a homopolymer or copolymer having at least about 80 weight percent of units derived from polymerization of ethylene, propylene, butylene, or a mixture thereof.

[c10]

10. The thermoplastic composition of Claim 1, wherein the polyolefin is a propylene polymer; wherein the propylene polymer is a homopolymer of polypropylene, or a random, graft, or block copolymer of propylene and at least one olefin selected from ethylene and C₄-C₁₀ alpha-olefins, with the proviso that the copolymer comprises at least about 80 weight percent of repeating units derived from propylene.

[c11]

11. The thermoplastic composition of Claim 1, wherein the polyolefin comprises a homopolypropylene.

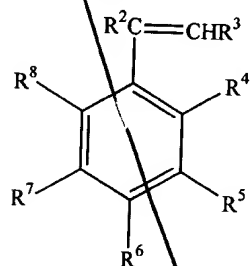
[c12]

12. The thermoplastic composition of Claim 1, wherein the polyolefin is present at about 10 weight percent to about 60 weight percent, based on the total weight of the composition.

[c13]

13. The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer comprises:

(A) at least one block derived from an alkenyl aromatic compound having the formula



wherein R² and R³ each represent a hydrogen atom, a C₁-C₈ alkyl group, or a C₂-C₈ alkenyl group; R⁴ and R⁸ each represent a hydrogen atom, a C₁-C₈ alkyl group, a chlorine atom, or a bromine atom; and R⁵-R⁷ each independently represent a hydrogen atom, a C₁-C₈ alkyl group, or a C₂-C₈ alkenyl group, or R⁴ and R⁵ are taken together with the central aromatic ring to form a naphthyl group, or R⁵ and R⁶ are taken together with the central aromatic ring to form a naphthyl group including; and

(B) at least one block derived from a conjugated diene, in which the aliphatic unsaturated group content in the block (B) is reduced by hydrogenation.

[c14]

14. The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer comprises a styrene-(ethylene-butylene)-styrene triblock copolymer.

[c15]

15. The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer has a styrene content of about 50 to about 85 weight percent.

[c16]

16. The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer has a styrene content of about 55 to about 70 weight percent.

[c17]

17. The thermoplastic composition of Claim 1, wherein the hydrogenated block copolymer is present at about 1 weight percent to about 20 weight percent, based on the total weight of the composition.

[c18]

18. The thermoplastic composition of Claim 1, wherein the a polyolefin-graft-cyclic anhydride copolymer is a polypropylene-graft-maleic anhydride copolymer.

[c19]

19. The thermoplastic composition of Claim 1, wherein the a polyolefin-graft-cyclic anhydride copolymer is present at about 0.1 to about 10 weight percent, based on the total weight of the composition.

[c38] 38. The thermoplastic composition of Claim 1, wherein the composition after molding exhibits a flexural modulus at 23 ° C according to ASTM D790 greater than about 300 kpsi.

[c39] 39. The thermoplastic composition of Claim 1, wherein the composition after molding exhibits a sample-to-sample variability in Flexural Modulus at 23 ° C of less than about 10 percent.

[c40] 40. A thermoplastic composition, comprising:
a poly(arylene ether);
a poly(alkenyl aromatic) resin;
a polyolefin;
a hydrogenated block copolymer of an alkenyl aromatic compound and a conjugated diene, wherein the hydrogenated block copolymer has an alkenyl aromatic content of about 40 to about 90 weight percent;
a polypropylene-polystyrene graft copolymer or an unhydrogenated block copolymer of an alkenyl aromatic compound and a conjugated diene; and
a reinforcing filler.

[c41] 41. A thermoplastic composition, comprising:
about 10 to about 55 weight percent of a poly(arylene ether);
about 1 to about 50 weight percent of a poly(alkenyl aromatic) resin; wherein the amount of poly(alkenyl aromatic) resin is at least about 10 weight percent of the total of the poly(arylene ether) and the poly(alkenyl aromatic) resin;
about 10 to about 60 weight percent of a polyolefin;
about 1 to about 20 weight percent of a hydrogenated block copolymer of alkenyl aromatic compound and a conjugated diene having an alkenyl aromatic content of about 40 to about 90 weight percent;
about 0.1 to about 10 weight percent of a polyolefin-graft-cyclic anhydride copolymer; and
about 1 to about 50 weight percent of a reinforcing filler;
wherein all weight percents are based on the total weight of the composition.

[c42] 42. A thermoplastic composition, comprising:
about 10 to about 55 weight percent of a poly(arylene ether);
about 1 to about 50 weight percent of a poly(alkenyl aromatic) resin;

about 10 to about 60 weight percent of a polyolefin;
about 1 to about 20 weight percent of a hydrogenated block copolymer of alkenyl aromatic compound and a conjugated diene having an alkenyl aromatic content of about 40 to about 90 weight percent;
about 0.5 to about 20 weight percent of a polypropylene-polystyrene graft copolymer or an unhydrogenated block copolymer of an alkenyl aromatic compound and a conjugated diene; and
about 1 to about 50 weight percent of a reinforcing filler;
wherein all weight percents are based on the total weight of the composition.

[c43]

43.A thermoplastic composition, comprising:
about 10 to about 55 weight percent of a poly(arylene ether);
about 1 to about 50 weight percent of a poly(alkenyl aromatic) resin;
about 10 to about 60 weight percent of a polyolefin;
about 1 to about 20 weight percent of a hydrogenated block copolymer of alkenyl aromatic compound and a conjugated diene having an alkenyl aromatic content of about 40 to about 90 weight percent;
about 1 to about 50 weight percent of a reinforcing filler;
about 0.5 to about 20 weight percent of a polypropylene-polystyrene graft copolymer or an unhydrogenated block copolymer of an alkenyl aromatic compound and a conjugated diene; and
about 0.5 to about 25 weight percent of an ethylene/alpha-olefin elastomeric copolymer;
wherein all weight percents are based on the total weight of the composition.

[c44]

44.A thermoplastic composition, comprising the reaction product of:
a poly(arylene ether);
a poly(alkenyl aromatic) resin in an amount of at least about 10 weight percent of the total of the poly(arylene ether) and the poly(alkenyl aromatic) resin;
a polyolefin;
a hydrogenated block copolymer of an alkenyl aromatic compound and a conjugated diene, wherein the hydrogenated block copolymer has an alkenyl aromatic content of about 40 to about 90 weight percent;
a polyolefin-graft-cyclic anhydride copolymer; and
a reinforcing filler.

[c45]

45. An article comprising the composition of Claim 44.

[c46]

46. An article comprising the composition of Claim 44, wherein the article is formed using at least one method selected from the group consisting of injection molding, blow molding, extrusion, sheet extrusion, film extrusion, profile extrusion, pultrusion, compression molding, thermoforming, pressure forming, hydroforming, and vacuum forming.

[c47]

47. A sheet comprising the composition of Claim 44.

FOOTNOTES